

Nova Scotia, and on the morning of the 3d off Cape Breton island. Its movement of translation was about sixty miles an hour. The lowest barometer observed was 29.39 inches at Block Island, Rhode Island, and New Haven, Connecticut, on the 2d.

II.—The following appeared in the "New York Herald" of October 15th, and are the only data received beyond the stations of observation, relative to the movement of this disturbance:

PANAMA, Oct. 6.—The Pacific Mail steamship "San Blas," Captain Chapman, on her last voyage to this port from San Francisco, encountered a cyclone off Cape Corrientes. The barometer commenced to fall at about six o'clock p. m., on September 22d, and went down to 28.85. When the indications denoted that the vessel was running toward the edge of a cyclone, she was headed away and finally brought to with her head southward and engines going slowly. The wind blew with hurricane force, accompanied by terrific rain squalls with a fearful cross sea, the lee main rail being in the water, although none came in from the windward. The data obtainable from the shift of the wind and the average fall of the barometer, lead Captain Chapman to estimate the diameter of the cyclone at about two hundred miles and its track at nearly northwest. Its rate of progression was about fifteen miles an hour, and the distance between the ship and the focus, when passing each other, about seventy miles.

From the track of low area number ii. as charted, there appears no reason to doubt but that it is the same disturbance encountered by the "San Blas." Captain Chapman stated the hurricane was moving to the northwest. Yuma, Arizona Territory, where this area made its appearance, lies in a direction about north-northwest from Cape Corrientes. The distance of the centre of storm from the vessel was estimated as about seventy miles. It is not known how far the vessel was from the shore, but presumed less than thirty miles, and such being the case, the centre must have been over the land. While the data obtained are not sufficient to determine the earlier movements of this disturbance, the above facts would seem to indicate that it approached Mexico from the eastern coast, probably from the Caribbean sea and moved over the land in a north-westerly direction, following the parabolic path usual with these storms, and after reaching Cape Corrientes diminished considerably in energy and entered Arizona Territory a weak depression. After its appearance at midnight of the 2d it continued in a northwesterly course until the afternoon of the 3d, at which time it was central north of Sacramento, California. From this point it recurved and moved northeasterly, passing into British America on the 4th.

III.—This depression developed in Arizona on the evening of the 6th. The midnight report of that date showed the pressure to be below the normal in the territory between the Missouri river and Sierra Nevada mountains, the greatest departures being in western Dakota and Arizona. The depression in Arizona moved rapidly northeastward. At midnight of the 7th the centre was near Yankton, Dakota, and on the morning of the 8th it united with low area number iv. east of Manitoba. Rain fell in the Missouri and upper Mississippi valleys and upper lake region during passage of storm.

IV.—The development of this area has been mentioned in description of number iii. After its formation at midnight of the 6th, it moved slowly northeastward from western Dakota until it united with number iii. on the 8th, after which the combined areas moved with greater rapidity, passing into British America beyond the limits of observation.

V.—After the disappearance of numbers iii. and iv., a secondary depression formed near Saint Paul, Minnesota, during the afternoon of the 8th. Light rains had fallen in the northern portions of the upper lake region, and strong southerly winds prevailed on the lakes. On the morning of the 9th the depression was central near Marquette, Michigan, having moved in a northeasterly direction from Minnesota. It continued its northeasterly course, and at midnight of the 9th it was central some distance north of Father Point, Province of Quebec; from that point it cannot be further traced.

VI.—This weak depression developed in Indiana during the afternoon of the 13th, and was then central near Indianapolis. It moved rapidly northeastward, accompanied by rain, and strong northerly winds prevailed on the lower lakes. The morning

report of the 14th showed the area to be central in Maine. At this hour high southerly winds prevailed on the coasts of New England and New Jersey. Rain fell in all districts from the Missouri valley eastward, including the Gulf states. The depression disappeared beyond the limits of the chart on the 14th, passing over the Gulf of Saint Lawrence and New Foundland.

VII.—The midnight report of the 15th showed the pressure to be .17 of an inch below the normal at Yuma, Arizona Territory. Light rain had fallen in Utah, Arizona, and western Texas. During the 16th the depression moved northeastward and at midnight was central in Colorado. The rain-area extended from the Mississippi river to the Sierra Nevada mountains, and high winds prevailed in the Missouri valley and adjacent territories. As the depression continued its northeasterly course the winds on the upper lakes increased in force, blowing with considerable violence on the 17th and 18th. On the morning of the latter date the centre of disturbance was in Manitoba, and during the day passed into British America. Numerous newspapers commented upon the intensity of the storm, particularly on Lake Michigan. But few casualties are reported, as the vessels generally remained in port. Rain fell in nearly all districts during the passage of this area.

VIII.—The afternoon report of the 24th showed the development of a weak depression in Arkansas. The area moved northeasterly, and on the morning of the 25th was central over Lake Erie. Light rains had fallen in all districts. This depression instead of increasing in energy on reaching the lake region, as is usual, diminished considerably after the 25th and altered its course to a more easterly direction. On the morning of the 26th it was central near Buffalo, New York. At midnight its centre was off the coast of Maine, and by the afternoon of the 27th, disappeared off Nova Scotia, still continuing its easterly movement. The lowest barometer observed was 29.85 inches at Cleveland, Ohio, at midnight of the 25th.

IX.—The pressure at midnight of the 28th was .58 of an inch below the normal at Saint Louis, Missouri. At the same hour a depression was central in the Saskatchewan valley, apparently moving eastward. The latter disturbance was last observed in Manitoba on the morning of the 29th. Owing to absence of reports from the territory north of Lake Superior, it cannot be determined whether number ix. united with this area, or a portion of it, on the afternoon of the 29th near Lake Huron, or not. The depression in Missouri moved northeasterly increasing in energy, and was central on the morning of the 29th in northern Indiana. During the afternoon it developed into a storm of great energy, central over Georgian bay, the barometer at Saugeen reading 29.18 inches. Westerly winds prevailed on the Lakes and the pressure rapidly increasing in rear of the storm, the winds increased in force, blowing with a velocity from twenty-five to thirty-six miles an hour. General rains fell in all districts east of the Missouri valley. The disturbance followed the course of the Saint Lawrence river, accompanied by high winds, and on the morning of the 30th was central near Quebec. It disappeared on the 31st, moving in a northeasterly direction. Severe gales also occurred on the Atlantic coast during the passage of this area. The lowest barometer observed was 28.87 inches at Anticosti Island, Gulf of Saint Lawrence, on the 30th.

#### NORTH ATLANTIC STORMS DURING OCTOBER, 1883.

(Pressure expressed in inches and in millimetres; wind-force by scale of 0—10.)

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during October, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in the north Atlantic, and from other miscellaneous data received at this office up to November 21st. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m., Washington, or 0 h. 8 m. p. m., Greenwich mean time.

The approximate paths of seven depressions, all of which have moved in a northeasterly direction, are traced on the chart. Four of these are apparently extensions of the tracks of storms that originated in the United States; two appear to have developed in mid-ocean; and one number Va., was apparently of tropical origin, but owing to lack of data it is traced only from 30° north latitude. This last disturbance appears to have moved northwestward between Bermuda and coast of the United States, and to have recurved when near the latitude of Cape Hatteras, North Carolina.

During the period from the 9th to 17th violent northeasterly and easterly gales were reported by vessels in the Gulf stream between Bermuda and the southern sea-board states. The barometric observations at stations on the south Atlantic coast indicate that the centre of disturbance was near the coast of the Carolinas on the 12th and 13th, but the vessel-reports received to date are too indefinite to admit of an approximate tracing of the path of this depression.

The weather over the north Atlantic ocean during October, 1883, was, in general, stormy, but more particularly so during the last half of the month. From the 1st to 13th strong variable breezes to moderate gales, with generally fair weather and occasional fogs were reported; from the 13th to the end of the month there was a succession of strong southerly to westerly and northwesterly gales.

The following descriptions refer to the depressions shown on the chart:

I.—This is probably a continuation of the depression charted as low area i., chart i. The disturbance passed into the Atlantic during the 2d and 3d, causing moderate to strong gales in the Maritime Provinces and along the New England coast. On the 4th the storm-centre was south of Newfoundland, the lowest reported barometric reading being 29.58 (751.3), with moderate s. gales to the eastward and strong w. breezes to the westward of the centre. During the day the disturbance moved northeastward with gradually increasing pressure at the centre; and on the following day (6th) the depression apparently filled up when north of the fiftieth parallel.

II.—This disturbance appeared to the northward of Newfoundland on the 10th, and was probably a continuation of low area v., the remains of which passed northeastward over the Gulf of Saint Lawrence. On the 10th the s. s. "Sardinian," in N. 55° 54', W. 46° 05', reported barometer 29.83 (757.7) being a fall of .4 inch since the preceding observation, wind s. by w., force 8, overcast. During the day the disturbance moved eastward attended by gradually decreasing pressure and displaying increased storm-energy; and by the 11th the region of least pressure was shown near N. 56°, W. 40°. The s. s. "Dominion" in N. 54° 45', W. 39° 06', reported barometer, 29.52 (749.8), wind wsw., force 5, cloudy; s. s. "State of Indiana," in N. 52° 04', W. 37° 35', barometer, 29.55 (750.6), wind w., force 5, raining; and the s. s. "State of Georgia," to the southeastward of the centre in N. 53° 19', W. 32° 12', reported barometer 29.67 (753.6), wind sw., force 7, cloudy and rainy weather. The depression continued to move eastward north of the fifty-fifth parallel, and on the 12th the centre was shown near W. 27°. On that date the s. s. "Dominion," in N. 55° 26', W. 31° 38', reported barometer 29.22 (742.2), wind n., force 5, cloudy; while the s. s. "State of Georgia," in N. 54° 25', W. 24° 23', reported barometer 29.14 (740.1), wind sw., fair. All vessels in the southern quadrants reported moderate sw. to nw. gales with cloudy to fair weather. By the 13th the storm-centre, having moved slowly eastward, was near W. 17°, and north of 57°, north latitude. The steamships "Dominion" and "State of Georgia" appear to have moved eastward with the depression and in its southern quadrants, the rate of progressive movement of the storm-centre being probably not much greater than the speed of the vessels themselves. The "Dominion," in N. 56° 01', W. 24° 06', reported barometer 29.18 (741.2), wind w. by n., force 5, cloudy, and the "State of Georgia," in N. 55° 08', W. 16° 10', barometer 29.26 (743.2), wind sw., force 7-8, squally. The s. s.

"Lake Huron," in N. 56° 09', W. 15° 22', also reported barometer 29.19 (741.4), wind sw., force 7, heavy sea and squally. On the 14th the storm-centre was apparently to the northwestward of northern Scotland.

III.—This disturbance developed in mid-ocean on the 14th. On that date the s. s. "British Prince," in N. 50° 36' W. 31° 57', reported barometer 29.52 (749.8), wind sw., force 6, cloudy; and the s. s. "Neckar" in N. 49° 30', W. 37° 17', had nw. to w. wind of force 7-5, barometer 29.44 (747.8), light rain. The ship "Festina Lente," in N. 50° 29', W. 34° 39', also reported barometer 29.57 (751.1), wind sw., force 7, heavy cross sea, raining. The depression moved northeastward with decreasing pressure, and, on the 15th, the centre reached N. 56°, W. 21°. The s. s. "Sardinian," in N. 56° 29', W. 25° 53', reported barometer 29.00 (736.6), wind nne., force 6, rainy squally weather, and the s. s. "British Prince," in N. 51° 35', W. 23° 53', barometer 29.11 (739.4), wind nw., force 7, cloudy. Strong westerly gales were reported by vessels to the south and west of the centre. Captain Inch, of the s. s. "Nessmore," reported as follows: 14th, in N. 48° 18', W. 27° 52', 1.30 p. m., wind wnw., force 4, hauled to sw., with light rain; wind continued to increase until 11 p. m., when it shifted suddenly to wnw., and steadily increased, with very violent rain squalls and heavy sea. Morning of the 15th, gale still blowing without any abatement (force 9); 12h. 8 min. (Greenwich mean time), barometer 29.22 (742.2); 10 p. m., wind and sea moderating, barometer 29.3 (744.2). On the 16th, the storm-centre was near the western coast of Scotland; at the centre of disturbance the pressure was below 29.00 (736.6), since the s. s. "Scandinavian," at Glasgow, reported barometer 28.97 (735.8), wind ssw., force 5, showery. After the passage of this disturbance the barometer remained low over the region between W. 20° and the British Isles until the 20th, and strong winds prevailed, which indicated the presence of depressions passing far north of the field of observation.

IV.—This disturbance appeared on the 23d, the region of least pressure being near N. 48° W. 42°. The s. s. "Fulda," in N. 48° 42', W. 41° 20' reported barometer 29.27 (743.4) wind s., force 6, light rain. During the day the depression moved northeastward; Captain Hughes of the s. s. "Lord Gough," in N. 49° 56', W. 37° 42' reported: 6 p. m., (Greenwich mean time) sudden shift of wind from sw to nw., force 5, barometer 29.21 (741.9). Captain Cochrane, of the s. s. "The Queen," also reported as follows: "At midnight of the 22d, barometer steadily falling with fresh increasing gale from sw. by s. and ssw., thick, misty weather; at 2 a. m., of the 24th, barometer at its lowest, 29.54 (750.3), wind shifted to nne., to nnw., and by noon it was back to wnw., the barometer rapidly rising after the shift of wind (ship's position—from N. 49° 12', W. 31° 55', on the 22d, to N. 46° 11', W. 42° 35' on the 24th)." On the 24th, the disturbance was central near N. 54° W. 23°, the s. s. "Iowa" in N. 51° 69' W. 24° 35' reporting barometer 29.41 (747.0) wind w. by n., force 5, cloudy; and the s. s. "Scythia," in N. 50° 14', W. 27° 00', barometer 29.45 (748.0) wind w. by n., force 4. During the day the depression apparently moved northeastward, reaching the Scottish coasts on the 25th.

Va.—The path of this depression, when between the Bermudas and the United States (22d-24th), is traced on chart i. of this REVIEW, and is afterwards continued eastward over the ocean on chart ii. The earliest marine data referring to this storm as yet received at this office are the reports of three or four vessels which encountered the storm when in or near the Gulf stream on the 22d. They are as follows: schooner "Etna," in N. 33° 30', W. 73° 40', strong ne. gale, lasting thirty hours; vessel split sails, and was driven one hundred and twenty miles southward. Schooner "Mahaska," off the coast of South Carolina, had a heavy ne. gale, in which she carried away head-gear. The ship "Hedwig," in N. 33° 45', W. 75° 34', reported barometer 30.08 (764.0), falling slowly, wind ene., force 3. The schooner "Jennie N. Huddell," in N. 33° 45', W. 77° 00', also reported barometer 30.1 (764.5), wind ne., fresh. All the above vessels

reported cloudy and threatening weather, with long e. sea-swell. The s. s. "Edith Godden," which arrived at New York October 24th from Jamaica, reported having encountered heavy ne. gales between N. 35° and Barnegat. On the 23d the wind shifted from ne. and e. to se. and s., which indicated that the storm-centre was moving westward; the barometric observations and wind force reported, however, do not show that the depression attained any great depth, or that it displayed unusual storm-energy. The ship "Hedwig," in N. 34° 26', W. 74° 30', reported barometer 30.02 (762.5), wind sse., force 3, long ene. swell, and the s. s. "D. J. Foley," in N. 32° 36', W. 75° 04', barometer 30.00 (762.0), wind se., force 2. During the 23d and 24th moderate to strong ne. gales prevailed off the New England coast. The disturbance appears to have recurred when between N. 34° and 35°; the ship "Hedwig," on the 24th, in N. 35° 32', W. 73° 14', reporting barometer 29.97 (761.2), wind nw. by n., force 5, squally; the s. s. "D. J. Foley" also reported, N. 35° 00', W. 74° 40', barometer 29.95 (760.7), wind nne., force 4. During the day the depression moved northeastward, and on the 25th it was central apparently at some distance to the south or southeast of Nova Scotia, the pressure ranging from 29.6 (751.8) to 29.7 (754.4). During the 26th the depression moved northeastward, and by the 27th it was central near N. 50°, W. 30°. Captain Vogelgesang of the s. s. "Rhaetia," in N. 50° 41', W. 29° 20', reported as follows: "Light wind shifting to se. with rain, squally at times, westerly sea decreasing, southerly sea increasing. The wind increased in force and went around to w., with heavy rain and heavy northerly sea-swell making up; at 12.45 p. m. the wind suddenly hauled to north, increasing to a hurricane, sky immediately clearing." The following observations were taken during the gale:

Time.	Barometer corrected.		Temperature.		Wind.	
	Inches.	Mill.	Fah.	Cent.	Dir.	Force (0-10)
October 27, 1.00 a. m.	29.82	757.4	50	10.0	WSW	4
" 4.00 a. m.	29.72	754.9	51	10.6	SSE	4-5
" 8.00 a. m.	29.48	758.9	53	11.7	NO.-E.	6
" 12.00 noon	29.06	738.0	55	12.8	WNW.	6
" 12.05 p. m.	29.03	737.4	55	12.8	W.	6
" 1.00 p. m.	29.06	738.2	51	10.6	W.	10
" 2.00 p. m.	29.07	738.4	50	10.0	W.	9
" 4.00 p. m.	29.32	744.8	50	10.0	N by W	10
" 8.00 p. m.	29.55	750.6	48	8.9	NW.	8
" 12.00 midnight	29.08	753.8	47	8.3	NW.	6-7

On the 28th the region of least pressure was near the fifty-fifth parallel and about W. 20°, in which region moderate to strong westerly to southerly gales were reported, barometer ranging from 29.45 (748.0) to 29.65 (773.1). On the following day the depression either filled up or passed beyond the limit of observation.

VI.—This was probably a continuation of the depression charted as low-area viii. It passed off the New England coast, accompanied by strong gales, on the 26th, and on the 27th it was central southeast of Nova Scotia. Captain Cochrane, of the s. s. "The Queen," reported: "At 3 p. m., of the 26th, the barometer began to fall rapidly and the wind increased to a strong gale from ese., with heavy rain; at 11 p. m., barometer at its lowest 29.47 (748.5), when the rain cleared off and the wind fell light from s. At 2 a. m., of the 27th, it came out from wsw. and then hauled to nw., thence at 8 a. m., to nne., barometer rising rapidly." (Ship's position at 8 a. m., of 27th, N. 41° 52', W. 60° 48'). The disturbance moved eastward during the 27th, and by the following day the region of least pressure was shown in N. 45°, W. 48°. The s. s. "Gellert," in N. 45° 37', W. 47° 50' reported barometer 29.43, (747.5), wind ene., force 5, cloudy. Vessels in the northwest quadrant of the depression reported strong ne. and n. gales, barometer ranging from 29.5 (749.3) to 29.6 (751.8). On the 29th vessels between W. 25° and 30° and near the fiftieth parallel reported strong s. and se. gales. Captain Inch, of the s. s. "Nessmore," in N. 50° 55', W. 27° 20', reported barometer

29.53 (750.0); 6 a. m. strong breeze from se., barometer falling until 6 p. m., when the wind blew a violent gale from se., force 9, with very high sea; 4 a. m. of the 30th, wind light and variable; 8 a. m., heavy wnw. gale and high cross sea. Strong nw. gales prevailed over the region west of the fortieth meridian. On the 30th the storm-centre was near N. 52°, W. 25°. On that date the s. s. "Wisconsin," in N. 51° 11', W. 24° 07', reported barometer 29.41 (747.0), wind s., force 7, cloudy; and the s. s. "British Prince," in N. 51° 23', W. 31° 26', barometer 29.56 (750.8), wind wsw., force 8, squally. By the 31st the atmospheric pressure had greatly increased over the region east of 35° west longitude, but it had decreased to the westward of that meridian, owing to the advance of depression vii; strong westerly gales continued, however, in the region between N. 50° and 55°, and W. 35° and 20°.

VII.—This is a continuation of a deep depression of great energy which passed over the Maritime Provinces into the Atlantic on the 30th. On the 31st the disturbance was central east of Newfoundland, causing strong s. and sw. gales as far eastward as the fortieth meridian. Captain Gleadell, of the s. s. "Celtic," between N. 45° 11', W. 53° 07', and N. 43° 26', W. 58° 11', reports: "4 a. m., 30th, barometer standing at 30.23 (767.8), light w. breeze; from that time the barometer began to fall rapidly and the wind freshened. At noon the barometer had fallen to 29.95 (760.7), fresh s. breeze and rain; 6 p. m., barometer 29.38 (746.2), being the lowest reading; the wind had now freshened to a strong s. gale, with high confused sea. From 6 p. m. the barometer began to rise and the wind to moderate, and by noon of the 31st, it had moderated to a fresh breeze from wnw., barometer 29.92 (760.0)." A continuation of this depression will probably appear on the chart for November.

### TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for the month of October, 1883, is exhibited on chart iii. by the dotted isothermal lines.

In the first column of the following table are shown the normal temperatures of October in the several districts, as determined from the Signal Service records; the second column shows the mean temperature of October, 1883, and the third column shows the departures of October, 1883, from the normal:

Average Temperatures for October, 1883.

Districts.	Average for October, Signal-Service observations.		Comparison of Oct., 1883, with the average for several years.
	For several years.	For 1883.	
New England.....	52.8	49.2	3.6 below.
Middle Atlantic states.....	58.2	57.0	1.2 below.
South Atlantic states.....	65.0	66.9	1.9 above.
Florida peninsula.....	73.9	76.7	2.8 above.
Eastern Gulf.....	65.6	69.7	4.1 above.
Western Gulf.....	67.3	70.9	3.6 above.
Rio Grande valley.....	73.0	78.8	5.2 above.
Tennessee.....	60.8	63.7	2.9 above.
Ohio valley.....	57.4	57.0	0.4 below.
Lower lakes.....	51.7	49.3	2.4 below.
Upper lakes.....	48.2	45.6	2.6 below.
Extreme northwest.....	42.7	40.1	2.6 below.
Upper Mississippi valley.....	54.1	51.1	3.0 below.
Missouri valley.....	51.5	47.8	3.7 below.
Northern slope.....	44.6	41.0	3.6 below.
Middle slope.....	53.6	51.0	2.6 below.
Southern slope.....	63.3	64.5	1.2 above.
Northern plateau.....	48.4	46.8	1.6 below.
Southern plateau.....	61.3	58.0	3.3 below.
North Pacific.....	50.7	49.8	0.9 below.
Middle Pacific.....	59.2	57.7	1.5 below.
South Pacific.....	66.1	63.1	3.0 below.
Mount Washington, N. H.....	30.6	29.3	1.3 below.
Pike's Peak, Colo.....	21.5	16.4	5.1 below.
Salt Lake City, Utah.....	52.2	46.1	6.1 below.

In Tennessee, Florida, the Rio Grande valley, the south Atlantic and Gulf states, the mean temperature has been above the normal for October. The departures above the normal have averaged about 4° 3 in the Rio Grande valley and Gulf states, and about 2° 5 in Tennessee, Florida, and the south At-